

Regulus™ Statistical Multiplex Controller

Description

The Regulus™ Statistical Multiplex Controller allows operators and broadcasters to do statistical multiplexing on Scientific-Atlanta MPEG-2 encoders like the Encoder Model D9050, Continuum DVP™ Encoder Model D9030, Encoder Model D9032, the PowerVu® Advanced Encoder Model D9120, Polaris MKII™ Encoder, and the Pyxis MKII™ Encoder. The bit rate allocation model of the Regulus Controller optionally also allows for insertion of IP data transmitted with the video.



The Regulus Controller addresses the operator's desire to constantly improve cost-efficiency on TV services. It adds the ability to help optimize the content of a transmission bouquet including video, audio, and IP data, and compliments the extensive line of Scientific-Atlanta MPEG-2 encoders and multiplexers by adding statistical control of up to 16 independent services. The independent and direct low-delay connections to each encoding engine allow the Regulus Controller to react extremely quickly to changes in the picture and thereby help ensure advantageous usage of the available bandwidth.

The stand-alone nature of the Regulus Controller makes it independent of any multiplexer and it can thus be added to a multichannel encoding installation at any stage.

The Regulus Controller provides a variety of operational modes allowing the user to select the one multiplex control that brings excellent economy to the individual application.

Features

- Enables statistical multiplexing of up to 16 channels using Scientific-Atlanta encoders
- Connects directly to a range of Scientific-Atlanta's MPEG-2 encoders including: PowerVu D9120, HD D9050, Continuum DVP D9030, D9032, Polaris MKII and Pyxis MKII
- A dual statmux pool feature enables you to perform statistical multiplexing on two independent groups of programs using one Regulus Controller
- Allocates capacity dynamically on a continuous basis using advanced technology
- Allows you to add more channels or increase video quality
- Makes room for IP data in MPEG-2 transport streams
- Allows a mix of fixed rate and statistically multiplexed channels on the same multiplex
- You can prioritize channels and define rate ranges to target the application
- Fully DVB and MPEG-2 compliant
- Redundant power supply helps ensure uninterrupted operation if one power supply should fail
- Advanced redundancy support (Regulus Controller as well as MPEG-2 encoders)
- Highly compact and integrated solution – easy to install and use
- Includes Multi Encoder Manager - a powerful tool for the ROSA™ network manager

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Specifications

Release 1.4

General Specifications	
Operating temperature	0 to 45°C (32 to 113°F)
Cooling requirements	Convection, passive
Relative humidity	5 to 95%, non-condensing
Power supply	100 to 240 V AC \pm 10%
Power consumption, one PSU active	\leq 15 W
Power consumption, two PSUs active	\leq 20 W (in total for both inlets)
Weight	5.6 kg / 12.3 lbs
Dimensions (W x H x D)	482 x 44.5 x 470 mm (19 x 1.75 x 18.5 inches)

Encoding Parameters	
Statistical encoding	Using advanced and flexible bit rate allocation algorithms
Supported MPEG-2 encoders	Scientific-Atlanta MPEG-2 video encoders
Number of channels	1 to 16
MPEG-2 format	MP@ML. SD/SD and HD/HD statistical multiplexing Support for 3:2 pulldown inversion.
Rates per channel	Polaris/Pyxis Encoders: Up to 11 Mbit/s D9030/D9032 Encoder: Up to 15 Mbit/s, up to 50 Mbit/s for 4:2:2P@ML. D9050 HD Encoder: Up to 80 Mbit/s The lowest rate depends on encoder settings and the encoder model.
Video formats	525 / 625 line systems, and HD format 1080i
Synchronous mode	Only for Continuum DVP Model D9030, D9032 and D9050 Encoders

Interfaces	
Video encoder communications	RS-232 for statmux interface of the D9030/D9032/D9050 Encoder (aux. data interface on the Polaris/Pyxis family of encoders).
Alarm interface	Normally open and normally closed relay contacts
Control	Ethernet and RS-232

Monitoring and Control	
GUI	ROSA-based (encoding parameters via encoders or via the Multi Encoder Manager, generic settings on Regulus GUI)
Encoder parameters supported	Default rate, max. rate, priority and quality limit for each channel. Also min. rate and pool association for Model D9030, D9032 and D9050 Encoders
Settings on Regulus	Channel enable/disable, synchronous mode, safety margin, and max. number of active channels
Performance logging	Via RS-232 interface
Channel status	Front panel LED indicators
Power status	Front panel LED and power indication LED for each power supply on the rear panel

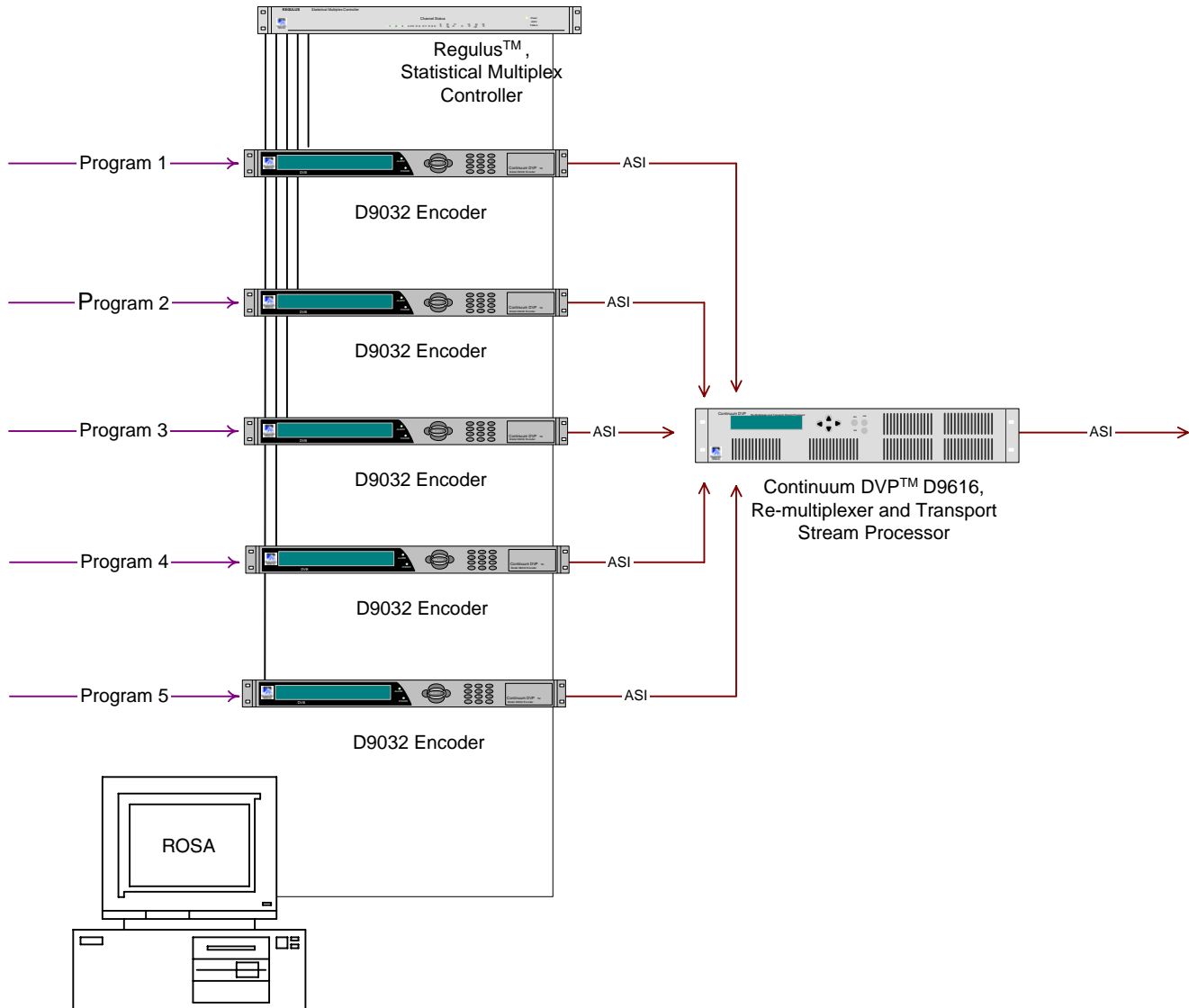
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Closed Loop Statistical Multiplexing

The Regulus Statistical Multiplex Controller enables encoding of multiple services with co-located MPEG-2 encoders into a combined transport stream output. Each encoder will encode a service with a variable bit rate matching the need of the given service. The Regulus Controller will coordinate the process to ensure that the specified bandwidth constraint is met, while optimizing the overall picture quality. It is termed a closed loop as each encoder is directly controlled to provide the optimal bit rate.

To groom the individual outputs there is a need for a multiplexer like the D9616 Multiplexer or similar as indicated in the figure below. A dedicated data connection between each encoder and the Regulus Controller is needed to provide correct and timely information for the statistical multiplexing process.



Example of a Statistical Multiplexing Setup with D9032 Encoders and a D9616 Multiplexer

For each encoder it is possible to specify minimum and maximum bit rates, as well as priorities for each service to balance higher priority services with others with a lower priority. Within the shared bandwidth, the group of encoders will use the available bandwidth.

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Quality Controlled Statistical Multiplexing

As a variation of the normal statistical multiplexing system, the Regulus Controller offers an option for quality controlled encoding. Here the encoder will not use more bits than needed to reach a predetermined quality level, hence other encoders without a quality limitation can benefit from that. If all encoders in the pool are quality controlled, then there may often be available bandwidth in the outgoing stream, which may subsequently be used for opportunistic data insertion.

Synchronous Versus Asynchronous Operation

To further improve the overall performance of the statistical multiplex, the Regulus Controller offers further efficiency improvements in synchronous operation. Synchronous operation can be used on D9030, D9032, and D9050 encoders, if all the video sources for the encoders are locked phase and frequency wise. As the D9032 encoder has a built in frame synchronizer, synchronous operation can always be used provided that the frame synchronizer is enabled.

When synchronous operation is enabled stuffing is minimized (null packed in the output stream) and the dynamic behavior is further improved.

Synchronous operation is recommended for small groups of encoders (e.g. four or less).

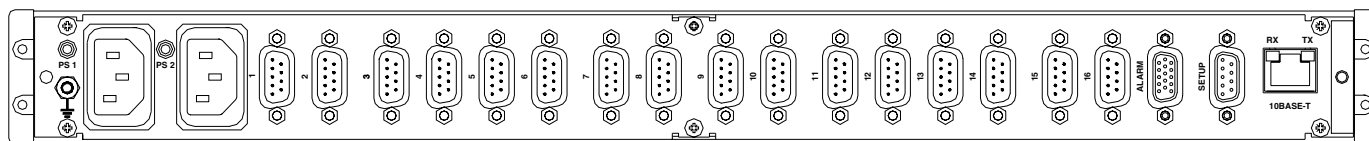
Dual Pool

The encoder GUI allows for selection of one of two pools, hence the Regulus Controller will allocate each encoder to one of two independent statistical multiplex groups.

Statistical Multiplexing of HDTV and SD Signals

The Regulus Controller also supports statistical multiplexing of HDTV services via the D9050 HD encoder. Any combination of 1080i, 720p and normal standard definition may be statistically multiplexed together. This allows the user to optimize both channel lineup and bandwidth at the same time.

Connector Panel



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Ordering Information

Regulus Statistical Multiplex Controller	Part Number
Support for 1 to 16 channels - statistical control of the D9050, D9032, D9030, D9120, Polaris MKII or Pyxis MKII Encoder	4004073
ROSA Regulus Driver - includes Multi Encoder Manager	V95298060



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